retention capacity of meltblown nonwoven webs. This results in only minor amounts of particles reaching the subsequent fine filter layers. By suitably adapting or matching the degrees of separation and particle retention capacities achieved by the individual layers, a homogenous loading of the entire filter material may be achieved, and thus a maximum filter performance is attained with the material used.

Fig. 1 depicts an example of a succession of three layers of filter media. It is clearly evident for a person skilled in the art, however, that the filter element according to the invention may also have two layers or more than three layers.

In a further preferred embodiment, in the case of three filter media layers, a third layer (2) may be arranged between filter medium (3) on the inflow side and filter medium (1) on the discharge side. This center layer may comprise a polyester nonwoven web and, preferably, a meltblown nonwoven web. If the center layer comprises a meltblown nonwoven web, it preferably will have an area weight of 15 – 100 g/m^2 and a thickness of 0.05 – 0.6 mm.

If the third layer is made of a simple polyester nonwoven web, the area weight is preferably between 15 and 150 g/m^2, and the thickness is preferably between 0.05 and 1.0 mm.

Particularly preferred arrangements are described below:

a) Two-layer medium
   Layer 1 on the filtered (clean) side: polyester nonwoven web; area weight 50 – 150 g/m^2, thickness 0.2 – 1.2 mm
   Layer 3 on the unfiltered (raw) side: polyester meltblown web; area weight 15 – 150 g/m^2, thickness 0.05 – 0.8 mm

b) Three-layer medium
   Layer 1 on the filtered (clean) side: polyester nonwoven web; area weight 30 – 100 g/m^2, thickness 0.1 – 0.6 mm

Center layer 2: polyester nonwoven web; area weight 30 – 100 g/m^2, thickness 0.1 – 0.6 mm

Layer 3 on the unfiltered (raw) side: polyester meltblown web; area weight 15 – 150 g/m^2, thickness 0.05 – 0.8 mm

c) Three-layer medium

Layer 1 on the filtered (clean) side: polyester nonwoven web; area weight 30 – 100 g/m^2, thickness 0.1 – 0.6 mm

Center layer 2: meltblown nonwoven web; area weight 15 – 100 g/m^2, thickness 0.05 – 0.6 mm

Layer 3 on the unfiltered (raw) side: polyester meltblown web; area weight 10 – 100 g/m^2, thickness 0.05 – 0.6 mm

d) Three-layer medium

Layer 1 on the filtered (clean) side: polyester meltblown web; area weight 15 – 100 g/m^2, thickness 0.05 – 0.6 mm

Center layer 2: polyester nonwoven web; area weight 30 – 150 g/m^2, thickness 0.1 – 1.0 mm

Layer 3 on the unfiltered (raw) side: polyester meltblown web; area weight 15 – 100 g/m^2, thickness 0.05 – 0.6 mm

It should be noted that this list is not exclusive. It will be apparent to a person skilled in the art that other combinations of the filter media layers are also possible within the scope of the invention.

In contrast to the arrangements of multi-layer filter media described in the prior art using at least one cellulose-based filter layer, the substantial advantage of the present invention is that the use of filter layers composed entirely of synthetic materials improves heat resistance and long-term stability to gaseous and liquid media. This makes possible long-term use of the filter media in the automotive field, even up to the life of the vehicle.

A further advantage is that the improved filter performance of the polyester nonwoven web arranged on the filtered side as compared to cellulose

media provides improved adaptation or matching of the individual layers in terms of pre-filtration/fine-filtration and thus yields improved filter performance of the overall multilayer medium while maintaining the same fluid (e.g., air) permeability. This advantage is achieved by the small fiber diameter and the high porosity of the meltblown non-woven material. The filter action, particularly the separation efficiency, initially increases with the retention of filtered particles during the period of use. The filter fineness of the layer on the inflow side is selected in such a way that through this fine layer a sufficiently long service life of the filter element is achieved.

In an advantageous preferred further embodiment of a filter system according to the invention, the superimposed layers of the filter media are folded into a star shape to form a filter element 4 (cf. Fig. 2). In particular, the layers of the filter media can be joined welded prior to or during the folding process by ultrasonic welding, or they can be joined by surface pressure during the folding process, for example in an embossing and folding machine. The layers can also be bonded with an adhesive, in which case it is preferred to use hot-melt or spray adhesive bonding.

The filter element according to the invention may be used as a fluid filter, for example, as a liquid filter for filtering the lubricating oil of an internal combustion engine of a motor vehicle, or as a filter for filtering gases such as the intake air for an internal combustion engine.

The foregoing description and examples have been set forth merely to illustrate the invention and are not intended to be limiting. Since modifications of the described embodiments incorporating the spirit and substance of the invention may occur to persons skilled in the art, the invention should be construed broadly to include all variations falling within the scope of the appended claims and equivalents thereof.